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DESIGN AND IMPLEMENTING A DETECTION SYSTEM FOR FOOD QUALITY

Dr. B. Paulchamy [1] | Mr. K. R. Kannan [2] | T. Menaka [3] | M. Muthukumar [3] | S. Priyadharshini [3]

[1] Professor & Head, Department of ECE, Hindusthan Institute of Technology, Coimbatore-32, (India).
[2] Assistant Professor, Department of ECE, Hindusthan Institute of Technology, Coimbatore-32, (India).
[3] U.G Students, Department of ECE, Hindusthan Institute of Technology, Coimbatore-32, (India).

ABSTRACT

Food quality is the quality properties of food that is acceptable by consumers. This includes important factors as appearance texture, and flavor. Food consumers are affected to any form of contamination that may occur during the manufacturing process or storage process. Besides ingredient quality, sanitation process is also important to ensure that the food processing environment is as clean as possible to produce the safest possible food for the consumer. Our proposed system gives the excellent quality management in food. It is based on embedded sensor like MQ135 sensor camera which determines the quality of the food. If there is any stone or bacteria present in the food that is analyzed through camera then the message will be sent to food authority by SMS notification for their number. Based on the combination of the camera and sensor outputs quality of the food should be detected.

KEYWORDS: Arduino controller, Buzzer, Camera, GSM, LCD, LED, MQ135sensor.

I. INTRODUCTION:

Food material with high quality, and edible or nontoxic substances is called food quality. The substance which degrades the quality of food material may spoil many lives. Low quality food makes the customer unsafe in our daily life and unhygienic for use. In the past few decades, expiration of food and low-quality food has become one of the serious problems. Consumption of expired food causes serious diseases like cancer, ulcers, asthma etc., The assurance and protection of food quality has always been important to man. The importance of certifying the quality of food and food products from the food industry will avoid health issue. In our daily life there are so many unhygienic and contaminated things are there. The term quality covers something different for people involved in the production and distribution of foods for consumers. The quality attribute of a particular product is based on the composition of the product, packaging used etc., Food quality primarily involves safety, nutritive value and acceptance. Simply it is defined as fitness for purpose

II. Extracting Knowledge from Existing Methods:

Chaitali Chandankhede [1] described to combat corruption in Public Distribution System(PDS). The system administrator can have check on the availability of ration to beneficiary on one side and the customers are able to see transactions at their end. As it is transparent, Food Process Solution(FPS) dealer cannot maintain fake ration cards at their end. Thus, development of automated public distribution system helps customers, retailers and administrators to maintain transparency and achieves reliable accountability.

Sashikala Mishra [2] suggested to use RFID card which contain detail information of user with his thumb impression thus there is very less chances to misuse the ration card also, the system will send transaction details to users registered mobile number through SMS gateway thus transparency is maintained in the system.

Carmen Serdan [3] demonstrated that thermos ultrasound treatment considerably reduced microbial loads and effectively inactivated pectin methyl esterase without affecting the content of antioxidant compounds and chelating activity. Prickly pear juice is an attractive source of bioactive compounds with antioxidant activity related with positive effects on human health through their potential to eliminate free radicals responsible of oxidative stress. This method is suitable alternative to conventional techniques for producing prickly pear fruit juice blend of good quality.

In the existing methodology, the texture analysis gives whether the given food is in solid, liquid or semi-solid form. In PDS, customers can see their transactions at the end. Some health issue will occur. Customers are cheated by the shopkeeper. Customer monitors the product only at the time of purchase. In the existing method, only the texture and PDS transparency and achieve reliable accountability in transaction alone done. This work will detect the food quality.

III. PROPOSED METHODOLOGY:

Food safety is an important public health problem that relates to human health and economic development. Contaminated food material brings a lot of easy money for the traders, but it may spoil many lives. Expired Food can lead to slow poisoning and various kinds of diseases, which can even result in death. To overcome these types of drawbacks we have designed this proposed system for checking food quality. In our method main modules are gas sensor and camera. By using camera, the accurate quality of the food can be identified. Food products contain any bacteria or rotten odour content in the food particles that is analyzed through the gas sensor. Therefore, quality of the food is known by the customer.

BLOCK DIAGRAM

Fig 1 clearly shows the functional block diagram of the proposed method. The camera captures the current image with predefined image, this was compared by the MATLAB which is connected to the Arduino controller through MAX232 for synchronization. In addition, the gas sensor is used to detect the smell of the food products which also connected to the controller where these are all inputs to the Arduino microcontroller. The output of the Arduino is through buzzer, GSM, LCD and LED. LCD which displays the increased in threshold value when the product is not good. These information is send to the GSM through Rs232.

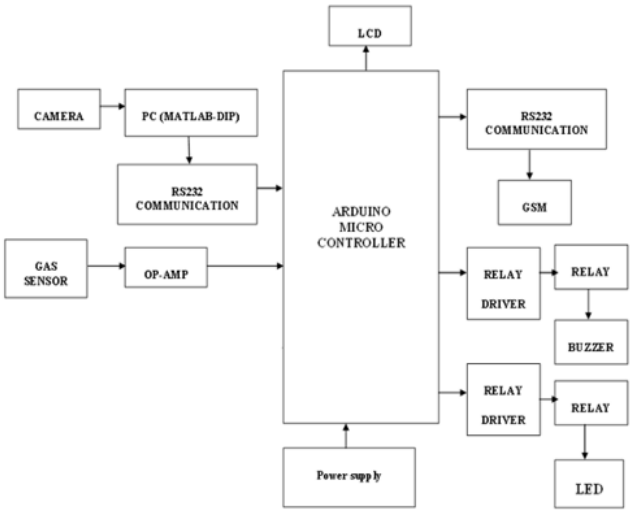

Figure 1: Overall Block Diagram.

FLOW CHART:

The Fig 2 shows the flow of execution of our project. Food products are analyzed through camera, the camera capture the current image with predefined image, this was compared by the MATLAB which is connected to the Arduino controller through MAX232. MAX232 is connected between MATLAB and Arduino microcontroller for synchronization. The gas sensor detect the smell of the food products which also connected to the controller. If the quality of the food product is not at the desired level, it sends data to the Arduino microcontroller. The output

of the Arduino is through Buzzer, GSM, LCD, LED. GSM send message through RS232 serial communication, Buzzer gives audio signal, LED which indicates light source, LCD which displays the increased in threshold value when the product is not good. If there is any variations in the food products GSM send message through RS232 as (Goods is not good) indicate low quality product. If there is no variation in the products the system shows the message as (authenticated with g) which indicates the product is good.

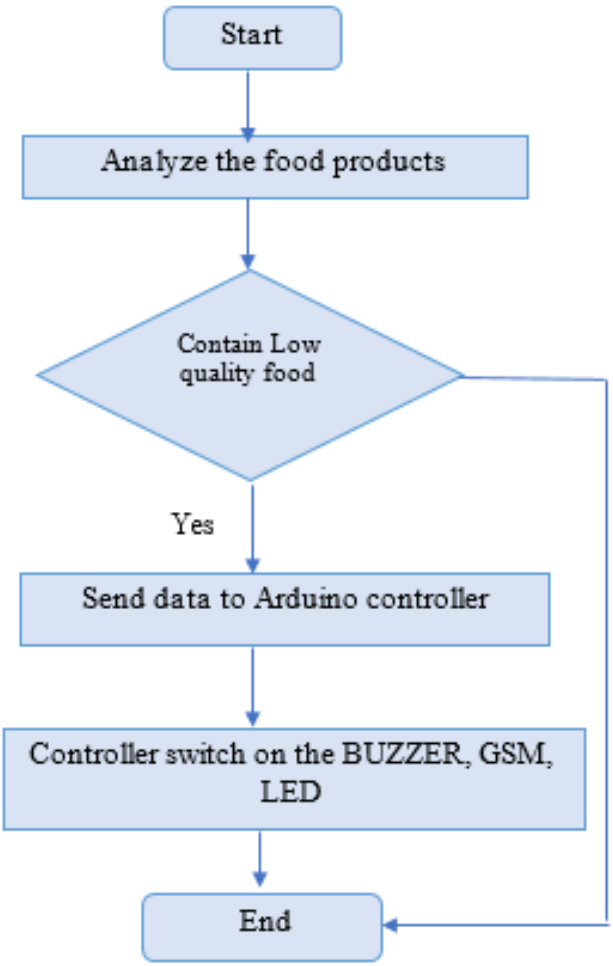

Figure 2: Flow chart

HARDWARE USED:

Figure 3: Arduino Microcontroller

Arduino microcontroller is equipped with set of digital and analog (I/O) pins. In this method, it get data from input units after satisfies the condition which we have programmed in Arduino it gives the required output.

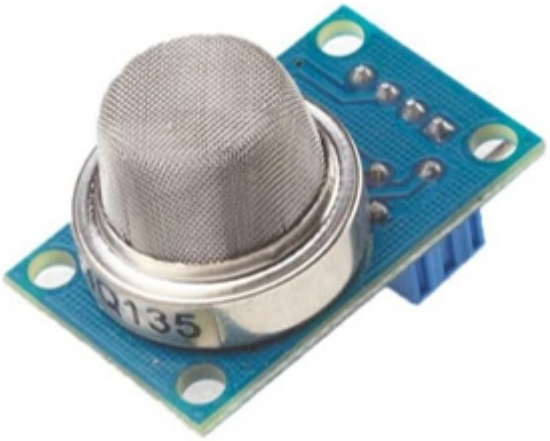

Figure 4: MQ135 Sensor

The gas sensor senses the air around 15 which shows in LCD that indicates normal air. In case it contains rotten odour the display the value around 150.

Figure 5: Camera

The camera is used to capture the image. In our method we are using portable camera for capturing the quality of the food product.

IV. RESULT&DISCUSSION:

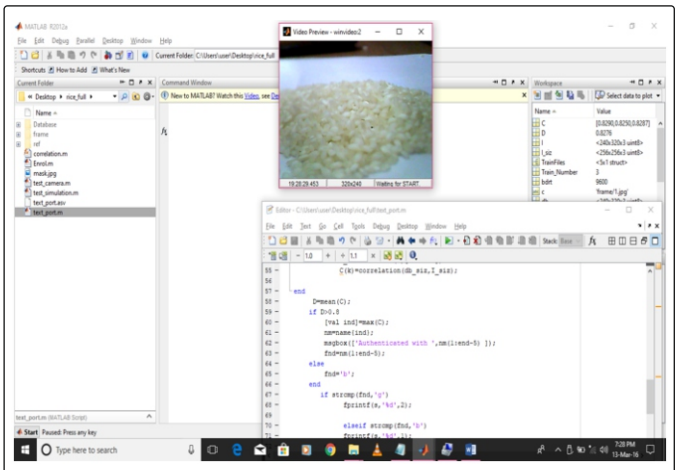

Figure 6: Captured Rice

This Fig 6 shows the good quality of rice image captured by the camera. The captured image is compared with Database image.

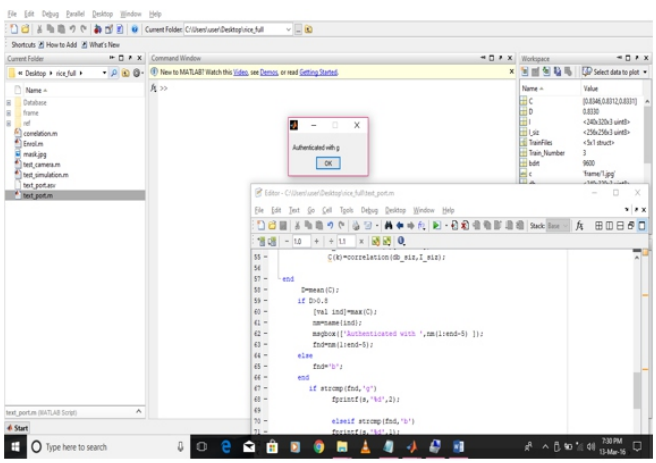

Figure 7: Output of good quality rice.

The Fig 7 indicates the snapshot of empirical result of good quality rice.

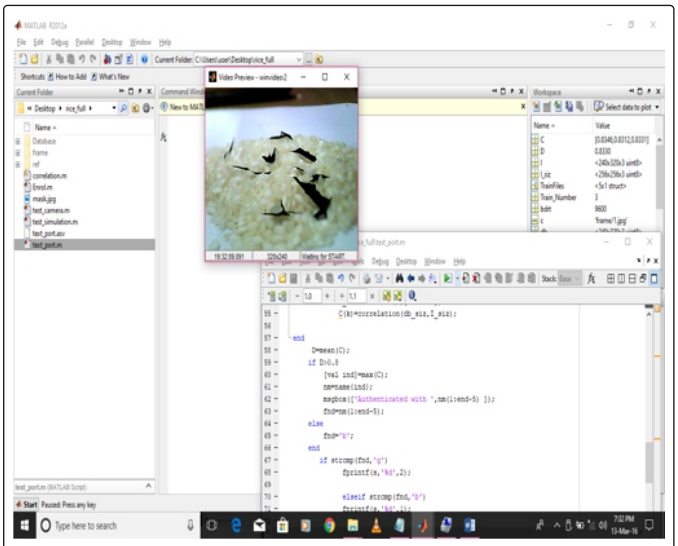

Figure 8: Snapshot for Low quality rice

In this Fig 8 it shows the snapshot of empirical result for dust particles in rice.

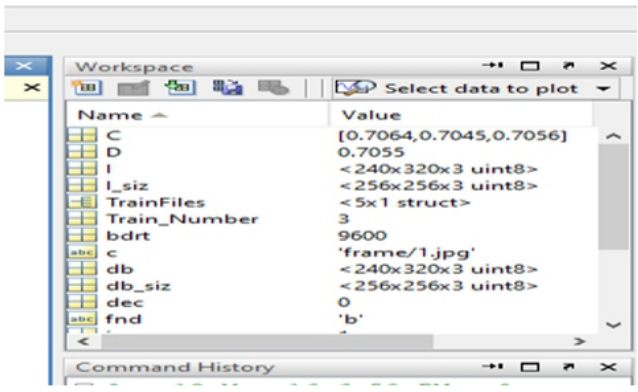

Figure 9: Output range for low quality rice

After comparing the low-quality image with database image then the threshold value decreases

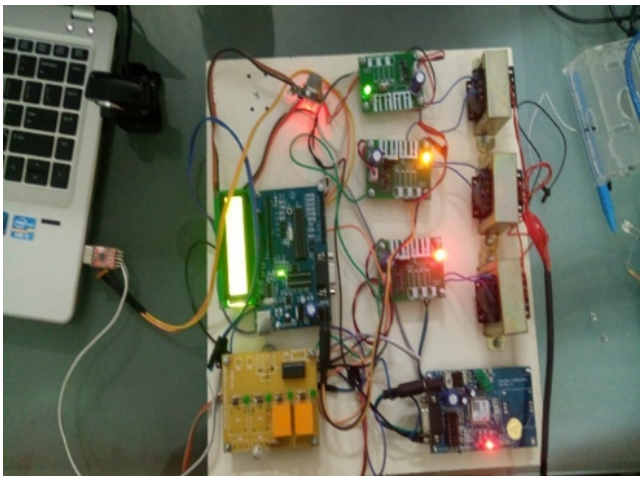

Figure 10: Designed module output using camera.

The snapshot of our designed module shows that after threshold value decreases controller send data to respective outputs.

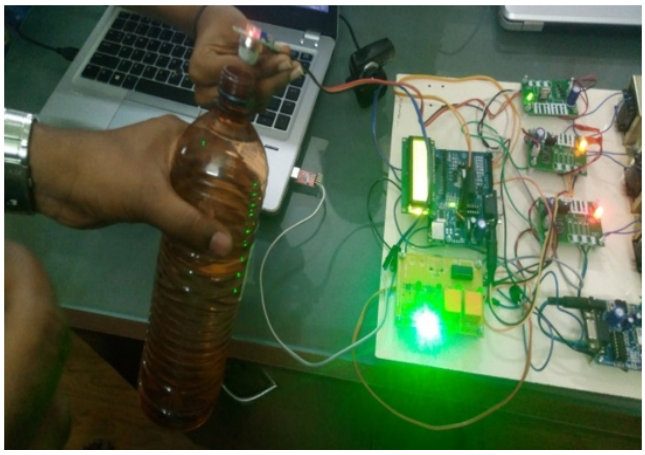

Figure 11: Designed module output using sensor.

The figure shows after sensor senses the bacteria contaminated food it will send data to the controller to indicate a output through buzzer sound, LED and GSM

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IV. CONCLUSION:

Quality management in food would be a most important factor for food industries. Our society always expecting the quality food. Because of corruption growing rapidly in all industries including food industries. So proposed method will helpful to our society public can easily check whether their food is quality or not. In future Instead of gas sensor we may use PH sensor and we may find food adulteration methodology. GSM sends the output through message to the customer but in future IOT will be used to send message to higher authorities.

VI. ACKNOWLEDGEMENT:

We would like to show our gratitude thanks to Mr.S. Ramu from Malumichampatti ration shop that has been a great support in developing our project.

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